



**Governor's Commission on Climate Change**  
***Built Environment Workgroup***

***Draft Recommendations***  
**10/16/08**

The Built Environment Workgroup of the Governor's Commission on Climate Change was charged with looking at opportunities to reduce greenhouse gas emissions and minimize negative effects on investments in our built environment through improvements in how Virginia manages these investments. These primarily are available through improvements that will reduce the energy needed to heat, cool, light, and operate equipment and systems in residential, commercial and industrial facilities and operations.

### **Membership**

When this workgroup was formed, the Governor's Energy Policy Advisory Council (GEPAC) had already begun to develop recommendations about needed policy changes to advance energy efficiency and conservation. Therefore, the Built Environment Workgroup was combined with the GEPAC to complete these deliberations

The Workgroup is comprised of the following Commission members:  
Stephen Walz (Chair); Ms. LuAnn Bennett; The Honorable David Bulova; Mr. Felix Garcia; The Honorable John H. (Jack) Gibbons; Ms. Jodi Gidley; Mr. Bill Greenleaf; Ms. Ann F. Jennings; Mr. Ty Murray; The Honorable Ralph Northam; and Mr. Paul Orentas.

The Governor's Energy Policy Advisory Council is comprised of the following members:  
Stephen Walz, (Chair); Mr. Larry Blanchfield; Mr. Karl E. Bren ; The Honorable L, Preston Bryant; Ms. Darlene L. Burcham; The Honorable Aneesh P. Chopra; The Honorable Patrick O. Gottschalk; Dr. Irene E. Leech; Mr. John M. Lewis, Jr.; Mr. George A. Minor; Mr. Ken Moss; Mr. Michael J. Quillen; Mr. William F. Tayler; and Ms. Eva S. Hardy.

### **Workgroup Recommendations**

Energy efficiency and conservation are the first steps available to Virginians to reduce greenhouse gas emissions. They can be implemented more quickly and in smaller increments than many other greenhouse gas reduction strategies. However, researchers have identified a number of barriers that limit investment in conservation and efficiency in the built environment below optimally economic efficient levels. These cause a failure of traditional markets to optimize investments.

- Upfront costs: Consumers face a barrier due to first-cost sensitivity and short time horizons for many energy-savings investments. Many consumers find it difficult to fund the one-time, upfront investment needed for efficiency projects or equipment.
- Confusion: Consumers may not be aware of, or have inadequate information about, the energy wasted by individual parts of their buildings or pieces of equipment or about what are the best energy-savings investments. This stops them from being able to make informed choices. Additionally, there often are real or perceived quality differences in energy efficiency options, raising the risk in consumers' minds about investments in energy efficient technologies. Confusion often results in no action being taken. Consumers also may not find energy efficient choices readily available to them in the marketplace.
- Multiple attributes: Consumers typically do not give as high priority to multi-attribute products, particularly when some attributes may be to society as a whole, not to the individual consumer.
- Principal agent: There are barriers where the person responsible for an investment, such as a building owner, is not the same as who is responsible for paying energy bills, such as a tenant.
- Regulatory: Energy providers may not be able to recover costs they might incur helping customers reduce energy use and may be penalized from decreased sales. Additionally, energy providers may receive enhanced returns from investments in supply infrastructure so are more likely to invest in supply than conservation.
- Dispersed actions: For ease of management and control of variables, private sector firms are more inclined to take on one large project rather than take on many small projects. Supply tends to be provided through large, central projects, whereas energy efficiency projects tend to be small and dispersed.

These barriers lead consumers and energy providers to apply a higher discount rate to investments in energy conservation and efficiency than for many other opportunities. State actions to increase investments in energy conservation and efficiency must overcome these natural market failures.

The following recommendations will advance energy efficiency and conservation and reduce Virginia's greenhouse gas emissions.

## **1. Investments in Energy Efficiency**

Utility investments in energy efficiency, both for internal operations and assisting customers, are more strongly motivated if the utility can receive a rate of return equal to supply side options. Under legislation enacted in 2008, natural gas utilities may receive an enhanced rate of return under a rate-decoupling program. There is no such provision for electric utilities.

Legislation should be passed to provide that (i) prudent electric utility operational expenditures for energy efficiency and demand management actions should be fully recoverable, and (ii) prudent electric utility capital investments should be fully recoverable and subject to the same enhanced return as clean energy supply options (200 basis points above the approved electric utility-wide allowable rate of return).

There are other investments in energy efficiency that would not be part of any utility-sponsored program. These include those that address non-utility fuels, have multi-fuel benefits, or provide a broader benefit beyond a single utility's ratepayers.

Overcoming the barriers for energy efficiency for non-utility fuels will require public support. This may be provided through a number of mechanisms. Local governments, authorities such as the Virginia Resources Authority or the Virginia Housing Development Authority, or others could provide capital for loans to consumers, returned on a pay-as-you-save basis. This would expand the concept used by Energy Savings Performance Contractors to a more distributed, smaller user market. These programs also could be supported through use of general tax revenues or a system benefits or similar surcharge on electric bills. While there may not be a direct nexus between an electric system benefit charge and general savings, electric bills are paid by all consumers. It would not be appropriate to use natural gas or water or sewer utilities as they do not serve the full universe of customers.

## **2. Smart Metering**

Smart metering and smart grids (often referred to as advanced metering infrastructure or AMI) provide new tools to manage energy use and implement energy efficiency and demand controls. Smart meters allow such strategies as remote control of equipment; use of energy use/cost monitors; smart appliance controls that modify appliance operation based on utility demands and costs; and real-time rates (time of use) that better reflect real-time revenue to real-time costs. Smart meters and grids allow electric utilities to better manage service quality. This allows utilities to operate transmission and distribution systems more efficiently, and better manage service outages.

Virginia should implement policies that support and encourage investments in advanced metering infrastructure across the electric transmission and distribution systems that serve the Commonwealth.

## **3. Educating Virginia's Energy Consumers**

Consumers need clear, trusted, timely information to make effective decisions about investing in energy efficiency. While this may not directly reduce energy use or greenhouse gas emissions, it is a critical component to effectively implementing other strategies. Energy conservation and efficiency consumer education may also serve multiple goals, such as leading to practices that reduce water pollution.

Virginia has recognized this with a 2008 legislative charge to the State Corporation Commission to develop an electric efficiency consumer education plan. The Commission issued its draft plan on October 6, 2008, outlining a five-year, \$10 million program. Recommendations include branding the energy education program, delivery of messages via purchased advertising on broadcast and in print media, through Web-based tools, through a toll-free phone service, and working in partnership with outside partners to deliver messages to defined or niche markets. The plan includes pre and ongoing testing

of consumer knowledge about energy conservation as a way to measure success of the effort.

The SCC plan recognizes the opportunities to partner with groups to enhance consumer education. We recommend that the program use multiple partners. For example, the Virginia Cooperative Extension has a network of experts around the state, but in recent years has done little energy efficiency consumer education. With sufficient funding, energy education could be a natural add-on to their services. State agencies such as the Departments of Housing and Community Development, Social Services, and Mines, Minerals and Energy may be used to enhance service to specific audiences. Non-governmental organizations may also reach specialized groups.

Funding for the consumer education actions is to come from the surcharge electric utilities pay to fund the SCC operations. This fund was previously used for the electricity choice consumer education plan. The final plan should include funding that is sustainable over its five-year term to allow for proper investment in the people and systems needed to deliver the educational message.

There may be other opportunities to target energy conservation and efficiency training and education at specific targets. For example, there is potential for energy savings and greenhouse gas sequestration on farms. A farm audit program could be enacted to expand efficiency practices in the agricultural sector. Other business-specific educational and technical assistance efforts, such as industrial efficiency programs or energy auditor training, should be more widely implemented in Virginia.

These efforts could be funded from sources with a nexus to the target audience. For example, an effort targeted to fuel oil users or transportation efficiency could be funded through a small increase in the fee that now supports the state's underground storage tank program.

#### **4. Renewables**

Renewable power can be generated from sources that do not add net greenhouse gas emissions to the atmosphere. These sources should receive credit for the value of their emission reductions compared to Virginia's current greenhouse gas emission profile. This can be provided for through use of carbon credits.

Individuals implementing small renewable energy systems in Virginia are eligible for net metering where electricity produced in excess of what is used on site is sent back onto the distribution network. The customer is credited for this power at the retail value of the power up to the amount of use by the customer. If the customer produces more than is consumed during each year-long net metering period, then the utility must purchase the excess electricity under a power purchase agreement at the SCC-approved net metering standard contract rate.

In accordance with 2007 legislation, Virginia's electric utilities are beginning to offer special tariffs for customers purchasing 100% green power. Under these green power tariffs, customers will typically pay a higher rate for green power. To provide parity

between green generation and charges, net metering customers should be paid for production back into the grid at the same rate the utility charges customers under the 100% green power tariff, not under the standard tariff rate.

As an additional incentive to implement distributed renewable systems, the Energy Star sales tax credit should be expanded to cover certified renewable energy equipment.

## **5. Weatherization**

The Weatherization Assistance Program (WAP) is operated by weatherization service providers in accordance with a program operated by the Department of Housing and Community Development. The program is funded through the federal Weatherization Assistance Program grant and a set aside of 15% of the Low Income Housing Energy Assistance Program (LIHEAP) funds received by the Commonwealth. The Commonwealth has periodically supplemented the federal funds with a General Fund appropriation or through use of Temporary Assistance for Needy Families (TANF) funds during times of rapidly rising energy costs. Weatherization services are available for low-income households, particularly for the elderly, individuals with disabilities, and families with children.

The Weatherization Assistance Program provides direct installation of energy-saving measures such as installing insulation; sealing air-leaks with caulking and weather-stripping; repairing leaky duct systems; repairing or replacing inefficient or unsafe heating systems; and installing carbon monoxide and smoke detectors. These improvements result in a permanent decrease in energy use and bills for families receiving weatherization services. Reduced energy use results in reduced greenhouse gas emissions from the fuel used to heat or cool the homes.

Under recent funding levels, (approximately \$4.2 million Weatherization Assistance Program funds, and \$6.8 million in LIHEAP funds in Fiscal Year 2007) the WAP has been able to improve around 2,000 families' homes each year. Each \$1 million increase in funding would allow an additional 200 homes to be weatherized. The WAP works most efficiently with relatively consistent funding from year to year. Sharp increases in funding followed by sharp decreases cause inefficiencies from having to staff and train crews and then eliminate crews as funding decreases.

The Built Environment workgroup recommends that funding for the WAP should be increased to allow additional homes to be weatherized. Note that subsequent to making this recommendation, the federal Congress increased the appropriation to the WAP and to LIHEAP. This will result in approximately a doubling of funding from last year.

As noted, the Weatherization Assistance Program works most effectively with stable amounts of funding from year-to-year. The programs will have to ramp up to use the additional federal funding appropriated this year. If the increased amount of funding is not maintained in future years, state funds might be needed to backfill the program's budget to provide for a stable program.

## **6. Utility rate schedules**

Electric utilities traditionally offer residential and small commercial rates that include a fixed monthly charge and a block rate that may vary as use increases. The fixed charge is to cover basic costs of service that remain the same regardless of use. The variable usage rates recover the remaining fixed costs as well as variable costs that change with use.

For Dominion Virginia Power, rates are higher in the summer to account for higher costs of power during summer months. Additionally, the company uses an inclining block structure during the summer where customers pay more for the higher usage blocks of power. This is reversed during the winter when the higher usage block is priced below the base block. Appalachian Power charges the same for both base and higher usage blocks.

Virginia's electric utilities also offer residential and small commercial consumers time-of-use-rates. The charges are higher during on-peak periods and lower off peak. Dominion Virginia Power's summer peak runs from 11 a.m. to 10 p.m.; in winter from 7-11 a.m. and 5-9 p.m. Appalachian Power has the same 7 a.m. to 8 p.m. peak period year round.

Large commercial and industrial users pay a basic monthly charge, a charge for electric demand (rate of use at any one time – comparable to pressure in a hose), and a charge for electric use (total amount used over the billing period – comparable to volume out of a hose). The demand is typically measured over a 15 or 30 minute period. Customers may be required to pay a minimum demand charge equal to 60 to 85% of their highest peak use even if they don't reach that demand in any billing month.

Utilities often offer special rates for churches, customers with ice or similar storage systems, customers who agree that water heaters or air conditioners may be cycled off during peak periods, and customers with other special circumstances.

Virginia electric utilities do not offer residential and small commercial customers a true time of use rate. These rates vary over the day, such as hour-by-hour, and from day-to-day as cost of power varies. The customer pays more as the utility must pay more for electricity during peak demand periods and less during low demand times. Customers using a true time-of-use rate have the ability and motivation to reduce electric use during periods of high demand and price. They may use less or shift use to lower demand periods. If enough customers reduce demand during peak periods, less power will be used during these peaks and less power must be either generated from peak power plants or purchased from outside suppliers.

This reduces the greenhouse gas emissions associated with peak generation. However, this also may shift emission patterns if electric use is shifted to off-peak times. To the extent that coal-based imports are replaced with off-peak, base load nuclear and coal generation, there will be a net reduction in greenhouse gas emissions. To the extent that natural gas peak power use is offset by increased firing of coal-fired base load generation, there will be a net increase. These impacts should be assessed based on Virginia's unique fuel mix and load profile. This analysis was beyond the scope of this assessment.

Electric utilities should pilot voluntary real-time rates to residential and commercial customers to understand the affect such rates would have on their cost structure and ensure costs are not shifted between time-of-use and other customers. After testing in pilots, these rates should be made available to all residential and commercial customers.

Virginia should also move towards increased block rate schedules year round, and consider using more than two rate blocks. This will encourage high-use consumers to use less power.

## **7. Public funds for energy efficiency**

As noted above, two primary barriers to implementing energy efficiency improvements are lack of upfront funding and customer confusion.

The Commonwealth should work with localities and community groups to provide a central, publicly-administered capital fund for energy efficiency investments, with the energy efficiency projects implemented through local implementation organizations.

For example, a local government could work with community groups to form a low profit, limited-liability company (L3C) to deliver services to local homes and businesses. Other potential local service providers could include current Weatherization Assistance Program service providers, or other local non-governmental organizations. Capital funds could be made available through the Virginia Resources Authority. Consumers would have a greater level of trust when the service is affiliated with their local and state governments.

The service should include an energy audit identifying savings potential, financing tied to energy savings, use of certified contractors to ensure quality control, and follow-up monitoring to ensure savings.

A central administrative body (state government or a non-governmental organization) could provide central energy efficiency consumer education material, central administrative services such as account management, and technical assistance to local service providers.

## **8. Building standards**

Minimum building performance standards may be set through two paths. Building codes provide for minimum safety and comfort standards. They have been expanded to include other minimum standards such as energy efficiency and handicapped access. In Virginia, building codes are based on standard codes developed through a consensus-building process by the International Code Council. Specifically, these include the International Energy Conservation Code (IECC) for single-family homes and low-rise residential structures. The International Code Council updates the code on a three-year cycle. Other structures are governed under the ASHRAE 90.1 standard. Other codes, such as the national electric code and national fire protection code, may also affect energy using systems.

Virginia uses the 2006 IECC and ASHRAE 90.1-2007 codes. The codes are adopted under the Uniform Statewide Building Code by the Board of Housing and Community Development following promulgation by the International Code Council. The codes are administered and enforced by local building officials in each city and county, subject to review by the state.

A relatively new building standard addresses energy and environmental impact of buildings and communities. These are generally referred to as green building or high-performance building standards. They include standards such as Energy Star, Earth Craft Homes, Leadership for Energy and Environmental Design (LEED), and Green Globe. These have been introduced as voluntary standards.

Compliance with these standards result in buildings that use less energy and therefore cause fewer greenhouse gas emissions. Additionally, these buildings use less water and have less overall environmental impact. Well-designed green buildings offer improved occupant comfort. Studies have shown generally increased sales in high-performance commercial buildings and increased student performance in high-performance schools.

Over the last few years, some local jurisdictions have required commercial buildings meet these green building standards. For example, starting in 2009, commercial buildings over 200,000 square feet in size in the District of Columbia will be required to meet LEED standards. Building size limits will be reduced until 2013, when all commercial buildings over 50,000 square feet in size must meet LEED standards.

Virginia should phase in requirements that all commercial buildings will meet LEED or equivalent standards. Virginia should harmonize the standards with neighboring jurisdictions such as the District of Columbia.

Governments should lead by example and all future state and local governmental new and substantially renovated buildings should meet at least LEED or equivalent standards. While the Commonwealth cannot control federal government actions, we recommend that all future federal buildings and substantial renovations meet LEED or equivalent standards.

## **9. Appliances**

The federal government has established minimum efficiency requirements for different types of energy using equipment such as heating and cooling systems and hot water heaters. Some states have established minimum appliance standards for certain energy-using equipment lacking federal minimum efficiency standards such as DVD players, compact audio equipment, hot food holding cabinets, portable electric spas, water dispensers, and furnace fans. States can use standards developed by the Appliance Standards Awareness Project to ensure that the state standards are consistent with other states and minimize market disruptions for manufacturers. Of Virginia's neighboring states, Maryland is setting up state-specific appliance standards.

The Built Environment workgroup recommended that Virginia should not establish separate appliance standards but should make consumer education about the benefits of purchasing and using higher-efficiency appliances a key component of its consumer education actions.